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ABSTRACT

This study examines the effects of task arrangements and management systems on student engagement rates. It is argued that the complexity of classroom arrangements influences the form and content of management systems, and that management decisions impact levels of student engagement. Intensive observation of 63 third and fourth grade students receiving bilingual education instruction under a federal Title VII grant and their teachers from nine California mathematics classrooms over a six-month period are the data source. The results provided partial confirmation of the hypothesized relationships. In low-complexity classrooms, engagement was related to one aspect of management, the offering of instructional explanations. In high-complexity situations engagement was positively associated with the management strategy of developing lateral relations. The paper concludes with implications for research concerning the contribution of organizational theory to classroom studies and for practice concerning the question of how strategies for management of classrooms can be adjusted to best suit the materials being presented. (JN)

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EFFECT OF TASK AND AUTHORITY STRUCTURES ON STUDENT TASK ENGAGEMENT

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Abstract

This study examines the effects of task arrangements and management systems on student engagement rates. It is argued that the complexity of classroom arrangements influences the form and content of management systems, and that management decisions impact levels of student engagement. Intensive observation of 63 students and their teachers from nine classrooms over a six-month period are the data source. The results provided partial confirmation of the hypothesized relationships. In low-complexity classrooms, engagement was related to one aspect of management, the offering of instructional explanations. In high-complexity situations engagement was positively associated with the management strategy of developing lateral relations. The paper concluded with implications for research concerning the contribution of organizational theory to classroom studies and for practice concerning the question of how strategies for management of classrooms can be adjusted to best suit the materials being presented.

EFFECT OF TASK AND AUTHORITY STRUCTURES ON STUDENT ENGAGEMENT[1]

An important criterion of success for classroom teachers is the ability to meet the needs of all students. However, the goal of attending to the needs of all one's students, of creating and maintaining the conditions under which academic and social learning takes place, is increasingly difficult in the complicated environment of the contemporary classroom. The deleterious effects of tracking or streaming of students (see for example, Rosenblum, 1980; Leinhardt and Pallay, 1982) have led schools to form classes with greater heterogeneity of ability. In addition, the passage of regulations emphasizing the need for a least restrictive environment has increased the complexity of today's classroom with the return of mildly handicapped students, students with learning disabilities, and students with mild behavioral problems. These factors have combined to make the objective of serving all the students' needs particularly difficult. The problem is especially acute for students who have been perceived as low achievers.

The bilingual classroom is a good example of a setting where teachers face the difficult task of meeting the needs of a heterogeneous student population. Along with the aforementioned mainstreaming and mixed academic abilities present in the classroom, there is the additional complexity introduced by the diversity of language skills of children. The bilingual classroom teacher is faced with the difficult task of creating and maintaining conditions for learning among children with widely varying levels of academic readiness and language ability. This study examines the effect of task arrangements and the accompanying classroom management

system on engagement rates of low achieving students in bilingual classrooms. It will be argued that a better understanding of the relationship of the task arrangements of the classroom to the teacher's management system will enable us to better understand how to promote learning among those children perceived as low achievers. By developing a clearer understanding of how to assist low achievers, it is hoped that we can make a significant contribution to meeting the needs of all students in the classroom.

This study examines the combinations of task arrangements and management systems which affect the engagement levels of students perceived as low achievers. It will be argued that first, the complexity of classroom arrangements influences the form and content of management systems; and, second, the presence of particular management dimensions in combination with the task arrangement is predicted to influence levels of student engagement (see Figure 1). The argument will be developed by combining two traditions of research. The first involves an empirical body of literature which separately related both task arrangements and management systems to student engagement. Little effort has been given to conditionalizing or relating these two sets of variables. The second perspective is derived from the organizational literature on differentiation and coordination. This literature offers some ideas about the relationship between task arrangements and performance outcomes. By combining the empirical literature on classroom management with the propositions from organizational theory, we can hypothesize the conditions under which engagement of students perceived as low achievers will be greatest.

Task Arrangemen s & Engagement

The notion of task arrangements in this study refers to the differentiation of groups and materials in the classroom. Differentiation is defined as the way in which the work and workers (i.e., students) are divided within the classroom. Small group work, which is sometimes used synonomously with differentiation, is one way in which teachers manage the diversity of student ability so that each student can be actively involved in learning. A number of studies suggest that engagement rates of students are higher during small group work than during independent seat work or conventional large group instruction (Peterson et al., 1981; Slavin, 1980; Sharan, 1980; Hess and Takanishi, 1974). For example, Webb (1982), found that the degree of group helping, giving help and receiving help in small student groups is positively related to student achievement. However, while the intrinsic interest or novelty of small group tasks may keep students attentive for a period of time, chaotic attention patterns may result unless the activities are well managed. For this reason, classes having a wide range of concurrent activities sometimes show lower achievement gains than classes with only one or two activities occurring simultaneously (McDonald and Elias, 1976; Stallings, 1980). This is because some teachers in multi-task settings are unable to supervise the work behavior of all students (Rosenshine, 1979; Berliner, 1979). Those findings have lead to the recommendation of less small group work and more whole class instruction (Medley, 1979; Brophy, 1979).

Management and Engagement

In short, while it is intuitively sensible to believe that variations in grouping students for instruction affect variations in student performance, equivocal findings relating task arrangements to engagement

suggest that other factors may account for variation in engagement. A number of studies indicate that teacher management differences may account for large variation in student engagement (Brophy, 1979; 1982; Stallings, 1980; Duke, 1979; Corno, 1979; Rosenshine, 1979). The essence of good management is to prevent behavior problems before they occur rather than to cope with them. Teachers who demonstrate sound prevention monitor the class continuously, are able to do more than one thing at a time without disrupting on-going class activities, provided a steady academic signal for students to heed, and provide smooth and efficient transitions between classroom activities (Brophy, 1982; Rosenshine, 1979).

Examination of the relationship between task arrangements and modes of management is facilitated by the organizational literature on differentiation and coordination. Where tasks are complex, organizations must adopt strategies either to reduce the information necessary to coordinate their activities or increase their capacity to process more information. The alternative is to allow performance standards to fall, and often levels of performance as well.

Conceptual Framework

The basic theoretical assumptions of "contingency theory" underlie the ideas of this study. This general framework assumes: (1) that there is no one best way to organize; (2) all ways of organizing are not equally effective; and (3) the best way to organize is contingent upon the uncertainty and diversity of the basic task being performed. As Galbraith (1973) formulates the issue: the greater the task uncertainty, the greater the amount of information that must be processed by decision makers during execution of the task in order to achieve a give level of performance.

A principle strategy that an organization (or a classroom) can employ to reduce the need to process information is the creation of self-contained tasks. Instead of dividing a task into different functions which require interdependence of parts to combine efforts, the organization gives to each group all the resources it needs to perform its tasks. The reduction of interdependence in the division of labor carries with it a reduction in the coordination required.

In more complex environments a key strategy for increasing the capacity to process information is the creation of lateral relations. Lateral relations are defined as the means by which groups or individuals charged with carrying out a task make direct contact with one another. In the classroom, lateral relations among students are maximized by teacher delegation of authority. In these more complex situations, more communication between teacher and student are required to maximize engagement. In classrooms where tasks are less complex, the linkage between the teacher and individual students is less involved or critical. Specifically, where tasks are standardized (e.g. everyone working on the same worksheet at the same time) the primary responsibility of the teacher is to simply explain the initial requirements of the task and to monitor students while the task is carried out.

When task arrangements are routine, non-complex strategies of management are appropriate. Since little interdependence is involved for instruction with the whole class performing the same or similar tasks, a more routine, large batch processing in management can be expected. The teacher will tell the students what to do and how to do it, and will check up to see that the task is carried out in the prescribed manner and that

the outcome is in the right form and correct (Cohen et al, 1979). Monitoring student progress is also a significant part of management. When students are engaged in seat work, engagement rates are higher where teachers actively monitor the entire class continuously (Brophy, 1982; Rosenshine, 1979). If task arrangements involve seat work and teacher supervision is less direct, students are more on their own and they are less likely to be engaged

Routine tasks also entail little interdependence among students. Therefore, minimum task communication among students is expected when the tasks are self-contained, assuming that the teacher provides enough seat work and backup assignments to keep students busy. When everyone is performing seat work, talking among students is not only not expected, very often it is not allowed. The emphasis in this system is on reducing information required for coordination by using self-contained tasks.

Under routine task arrangements characterized by low interdependence, teachers can be expected to exercise more disciplinary feedback. The public nature of the work in a recitation setting, for example, floods the teacher with evidence of student inattention, and under these conditions the teacher will make direct demands for quiet, eyes front, and listening behaviors. The number of these overt control attempts, however, is inversely related to engagement (Cooley and Leinhardt, 1980; Stallings, 1980; Rosenshine, 1979; Brophy, 1982). The more times a teacher has to ask for quiet and attention, the less attentive the students are, and the less effective the management.

In highly differentiated classrooms where task performance requires interdependent relations among students, complex strategies of management

and coordination are necessary. Multiple groupings of students, performing a variety of different tasks simultaneously, require different coordination than the relatively undifferentiated classroom. As the tasks become more complex, methods of coordination in which more information can be exchanged and processed are needed. The mutual adjustment characteristic of reciprocal interdependence takes place in the form of horizontal channels, in the lateral relations of group members working together, in group meetings where information is shared and schedules and procedures discussed (Cohen et al, 1979).

The classroom characterized by high task complexity differs markedly from the more routine classroom in the way information is carried. There is much more activity in the complex classroom, and students change activities more often. Consequently, the information channels of a hierarchic system do not have sufficient capacity to carry the load. If a teacher must directly supervise any and all problems arising from the work flow, the resulting bottleneck means students will be waiting, or confused and not engaged (Stallings, 1980). The polycentric system, however, has a much greater capacity for handling information; it flows under and around obstacles which would halt a more rigid kind of organization (MacKenzie, 1969). With lateral relations, students take over some of the supervisory tasks such as monitoring and directions. The teacher is then able to coordinate those problems which could halt the work flow and also help students who have difficulties.

One of the implications of the management system where children work interdependently is that the students themselves take over some of the management functions usually performed by the teacher. Interdependence may

also affect task arrangements by providing additional incentives for children to become involved in the tasks, such as commitment in helping others, and the sharing of information to allow others to complete tasks (Webb, 1982).

Management and coordination in complex classrooms requires many of the previous functions with some additional ones. As in the routine classroom, task directions characterize management in order that engagement takes place. There is much more frequent contact and interaction between students. Examples of typical problems which arise in such a system are resource questions which can be quickly determined, sequencing of an individual's activity, or checking that the task is properly carried out.

Unlike the low complexity classrooms where activity is more standardized, in the complex classroom the teacher will increase direction giving as an outgrowth of direct student need. More directions will be individually tailored to particular students. This will result in increased engagement, both from the individual attention given the student and from the fact that it is the student who solicits help from the teacher. If too many students continually call for the teacher's help, however, it may be a signal that the tasks are either not clear or that they are too difficult (Fisher et al, 1978; Rosenshine, 1979; Stallings 1980). Thus, the prediction that the degree of direction-giving varies with engagement level is conditionalized by the task difficulty and the task clarity. At the same time, fewer instances of academic explanation, especially to groups of students, should occur. Also important to the highly differentiated setting, there should be fewer instances of teacher

monitoring. Multi-tasks, multi-group settings will not lend themselves to standardized types of monitoring.

To facilitate information sharing in the complex classroom, teachers will have to delegate to students the authority to make decisions. Cooperation among students will increase to enable them to reach a solution to problems (Sharan, 1980; Slavin, 1980). The commitment of students to the group tasks is increased by peer interdependence. Engagement should therefore increase for low achieving students as peers serve to direct activity and help them through difficult or complicated activities (Webb, 1982).

Engagement in a classroom with a given complexity of task arrangements depends on the fit of the management system with the task arrangement. If a mismatch exists, engagement as the performance measure is likely to decline. In routine classes, teachers who do not actively monitor students as they work contribute to lack of engagement. In complex classes, teachers who do not delegate authority and do not allow lateral relations risk long lines of students waiting for help. In short, variations in the ability of teachers to manage their work arrangements effectively should produce variation in engagement levels.

Based on the foregoing discussion, this study tested the following general hypotheses:

H_1: As complexity of task arrangements increases, the number of teacher task directions should increase.

H_2: As complexity of task arrangements increases, the number of teacher task directions as a result of student need should increase.

H_3: As complexity of task arrangements increases, one should observe increased delegation of authority (lateral relations) by the teacher.

H_4: If complexity of task arrangements is low, engagement will be positively associated with the degree of monitoring and explanation.

H_5: If complexity of task arrangement is high, engagement will increase with the number of teacher directions and lateral relations.

Research Design

The objective of this study was to relate variations in task arrangements and management systems to engagement levels of low achieving students. An intensive, structured observation design of nine classrooms was chosen as an empirical test of the above stated hypotheses. To maximize variation in task arrangements observations were made during two different types of subject-matter lessons, mathematics and science.[2] These subjects also offer a wide variety of commonly used task arrangements by teachers ranging from whole class instruction where everyone is working on the same problem (low complexity) to a situation where small groups are working cooperatively to solve a problem (high interdependence/complexity).

Classroom and Student Selection

The classrooms selected for this study were part of a group receiving bilingual education instruction under a federal Title VII grant awarded to the San Jose Bilingual Education Consortium. This consortium was composed of nine cooperating school districts in the greater San Jose, California area. This study was part of a larger investigation designed to test the effects of a specially designed science curriculum which stresses thinking skills.[3] Nine classrooms from six different school districts were recruited both through oral presentation and a recruitment survey. The

classes were all third, fourth, or combination third/fourth grades. In selecting our sample, we imposed three criteria crucial to the implementation of the innovative curriculum being introduced: 1) consenting teachers were to have a positive attitude toward the use of learning centers (the core technology of the innovative science curriculum); 2) there needed to be an aide in the classroom who would work with the teacher on instructional matters for at least three hours during the day: and 3) there needed to be administrative support of the teacher's involvement in the project. The nine teachers were all experienced and were motivated by the fact that they were gaining increased competence in the use of the science curriculum. Teachers were allowed to keep all the curricula materials, and their concern for their students' learning made them receptive to the approach offered by the new curriculum

At least six target students were selected from each of the classes for indepth observation. Our intent was to target a group of students in each classroom who came closest to a description of children perceived to be low achievers, who had special educational needs, and who presented a challenge to the teacher in terms of meeting their needs in the heterogeneous classroom environment. The preceptions of teachers were used as the basis for this selection. The views of the teacher were chosen over some more "objective" criterion since the conceptual orientation of this paper is on the teacher as a manager and the assumption that systems of management will be adopted in accordance with the perceptions of teachers regarding the kinds of students they work with. Three questions were asked of teachers:

- Which of your students do you feel have the highest ability in mathematics? Which have the lowest ability?

- Are there some students in the class whom you have difficulty reaching?
- Which of your students are receiving some type of special or remedial service?

Students who received multiple nominations were selected. A total of 63 target students were selected for observation, 39 boys and 24 girls.

Observation Instruments and Measures

Three separate observation schemes were designed to collect data. One focused on the activities of the classroom as a whole, the second recorded the behaviors of the classroom teacher, while the third was designed to record the actions of target students. Data for the independent variable, complexity of task arrangements, was gathered from classroom observation. The mediating variable, teacher management, was measured through observation of both the teachers and the target students. The dependent variable, engagement of low achieving students, was gathered through direct observation of target children.

Observation of the nine classrooms were made over a two month period. Each observation period lasted between 30 minutes and one hour, during which time teacher behavior was recorded for a fifteen minute period, each target child was exclusively followed for a three minute interval and a five minute "snapshot" of the activities of the entire class was made. Forty percent of the observations were made during math lessons while the balance were taken during the innovative science curriculum activities.

Complexity of task arrangements was operationalized as the variation in grouping patterns. The whole class observation instrument was used to derive this empirical indicator. This instrument was designed to record

the number of groups in operation together with the number of students in each group. The grouping patterns in the math lessons ranged from individual contracts to whole class instruction. The science lessons involved the students working at a number of different pre-arranged centers. The number of centers (a total of 164) operational at any one time in a class varied from one to eight. The students at each center were defined as a separate group. To standardize the measure for classes of different sizes, we divided the number of groups by the number of students in the class. This produced a range of scores from .03 (i.e. all students working in the same group 1/30) to a high of 1.00 (i.e.. each student working individually 30/30).

Four types of management behaviors were observed: task directions, delegation of authority, monitoring, and explanations. Task directions were defined as the number of facilitations provided to individual students. Facilitations included helping students understand what they have to do to complete a task. It does not include academic content. The target child observation was used to collect this data. Each time the teacher offered direction to an observed student, a facilitation tally was added. In 60 percent of the observations of target students no facilitations were recorded. In the remaining 40 percent one or more facilitations were observed. Table 1 presents a summary of the frequencies for facilitations and the other measures discussed below.

Facilitations as a result of student need was added as a subset of task directions. It was defined as any facilitation which occurred after a student requested some assistance. Given the infrequency of task directions, it was not surprising to find very limited occurrence of this kind of behavior. In fact, across all the observations of target students

only 22 percent showed any sign of facilitation in response to a student's query.

Two indirect indicators of delegation of authority, were used: 1) peer task talk; and 2) the rate of students working together. This data was recorded from the target student observations. Peer task talk was measured by summing the number of task related interactions between the target child and other students in the class. In 46 percent of the observations there was no peer task talk. An equal proportion of the remainder was split between one or two such occurrences and more than two. The rate of working together was calculated by dividing the number of times a student was working with other students by the total number of categories of student behavior (including working alone, off task, in transition). In two-thirds of the observations students worked alone.

The final two indicators of management were drawn from the teacher observation instrument. The teacher observation instrument is a matrix grid which classifies teacher behavior into one of four categories: 1) nonverbal activities; 2) interaction with other adults; 3) interaction with groups; and 4) interaction with individual students. Of particular interest to us was one key aspect of nonverbal behavior on the part of the teacher, monitoring, and a central part of interaction with individuals, instructional explanations. Nonverbal monitoring was indicated when the teacher moved around the class watching students do their work. Of the 187 observations of the nine teachers, 41 percent of the cases involved no monitoring behavior.

Acts of instructional explanation by the teacher were defined as instances where substantive teaching was occurring. That is, situations where students were expected to gain substantive understanding through

clarification, extension or reinforcement by the teacher. Of the teaching sessions observed, 57 percent exhibited some instances of instructional explanation.

Engagement rates of target students, the dependent variable in this study, were taken from the target student observations. Engagement was defined as a ratio of the number of times a child was observed in work related activity (i.e. working alone, working with others, in transition on business, thinking, observing or listening) to the total number of all possible student behaviors. In half of the cases the students were engaged during the 3 observations. In another one-third of the cases the students were engaged in 50 percent or more of the time. Only one-sixth of the students were engaged less than half the time.

Coder Reliability

Three observers did all the target child observations and half of the teacher and whole class observations. For the remaining observations, 12 different observers were used. Each observer went through a two week training program, including on-site observations in non-participating classrooms. Reliability checks conducted on a regular basis, were calculated by counting the number of scores which were in agreement and dividing that figure by the total number of tallies for both observers. Observers were trained until a 90 percent agreement level was reached. Checks made throughout the regular observation period revealed between 80 and 90 percent reliability.

Results

The first three hypotheses test the relationship between the independent variable, complexity of task arrangements, and the mediating variable of management or coordination. The final two hypotheses test the association of management behavior and student engagement rates. These are conditionalized, such that different forms of management are hypothesized to affect engagement under varying task complexity.

The first hypothesis argued that increased task complexity would result in an increase in explanations, which are operationalized as facilitations by the teacher. The 187 observed lessons in the nine classrooms were dichotomized into low and high complexity conditions based on the frequencies of group differentiation described in the measurement section. Facilitations were also dichotomized and a chi-square test of statistical significance was employed. The results are presented in Table 2. As can be seen, there is no relationship between task complexity and facilitations.

Hypothesis two, that increased task complexity would be associated with greater facilitations as a result of student need, was confirmed by the data. Even breakdowns by individual classrooms revealed similar positive associations.

The third hypothesis argued that increased task complexity would be related to management which provided opportunities for increased delegation of authority. Data presented in Table 2 shows that both indirect indicators delegation -- task-related peer talk and frequency of working together -- revealed significant statistical relationships with task complexity in the hypothesized direction. In this case, the Student's

T-test of mean differences between the low and high complexity conditions for our two measures of delegated authority were employed.

Tests of the final two hypotheses concerning the relationship between management and engagement rates under varying conditions of task complexity are also presented in Table 2. Hypothesis four argued that under low task complexity, increased monitoring and increased instructional explanations would lead to increased engagement. Due to the skewed nature of the distribution of task complexity scores within both the high and low conditions, a Spearman rank order correlation coefficient was chosen as the appropriate statistical test. In the low complexity condition, engagement was significantly related to instructional explanations, but not to monitoring, giving only partial support for the fourth hypothesis. Hypothesis five argued that under high task complexity, engagement rates would be positively associated with lateral relations and task directions. Engagement rates were found to be significantly related to lateral relations but not teacher task direction.

Discussion

Complexity of Task Arrangements and Management

The findings of this study explain some aspects of the relationship between task complexity and classroom management. The first hypothesis predicted that as complexity increased so too would the number of teacher task directions as measured by facilitations. This was not confirmed by the observational data. It appears that teachers tend to talk equally in both conditions of complexity, helping students with problems, giving directions, and insuring that work continues smoothly. The reality may be that directions are as frequent in low as high complexity conditions.

Results for hypothesis two support the contention that as complexity increases, more individual problems of students arise which cannot be solved by simply giving general directions to the group. Instead, individualized task directions must be given to each student as his or her particular problem arises. The results for hypothesis two confirm this; the number of task directions as a result of student requests for assistance increased significantly in high complexity task arrangements. More students appeared to raise their hands for help or sought out the teacher for solutions to individual problems.

The area of greatest difference in management between high and low complexity task arrangements appears in the delegation of authority, hypothesis three. Lateral relations, the rate of students working together and peer task related talk, are the result of situations where teachers delegate authority. Significantly more working together and peer task talk occurred in high as compared to low complexity task arrangements. What appears to take place in the classroom is that students take over many of the management functions of the teacher, from setting up materials and allocating necessary resources to answering each other's questions regarding both what to do next and how to do it.

Management and Engagement

In the interpretation of engagement results the reader should recall that students observed in this study were seen as low-achieving math students by their teachers. While levels of engagement tended to be high in both low and high complexity task arrangements, engagement was relatively higher in the high complexity condition. This may reflect the influences of peers on target students in keeping interest high in the task

as they work together. Commitment to the group task may serve to increase engagement. Indeed, there is evidence that well structured cooperative group work does in fact pay off in achievement gains for lower achieving students (Slavin, 1980; Sharan, 1980).

Hypothesis four, predicted that under low complexity conditions, teacher monitoring and explanation would be positively associated with engagement was supported. The data revealed that there was a significant relationship between instructional, explanations, and engagement under low task complexity. This finding underscores the importance of students understanding the skills they need to solve computation problems through direct teacher instruction. In addition, teacher instruction may be interesting as an activity itself, especially against the backdrop of what seem to be endless days and pages of computations. The relatively passive seatwork emphasis of low task complexity may explain the finding of lower task engagement when compared to high complexity peer interaction. When students work alone, engagement rates tend to run about 68 percent; when students intersact with a teacher or teaching assistant, engagement increase to 85 percent (Rosenshine, 1979; Stallings, 1980). In the case of those low complexity task arrangements which were science periods, it seems likely that these were the times when teachers introduced tasks and gave general explanations which allowed the students to work successfully in small groups together, following group orientation.

In high complexity task arrangements, lateral relations were positively associated with engagement. It seems likely that peer relations

served to keep the majority of students engaged while the teacher's role became one of solving the problems of students who were not engaged. Further analysis of the data supported this explanation. Thirty-four percent of the teacher's directions were given to students who were not engaged but who became engaged after the teacher's intervention.

Limitations of the Study

It must be noted that several measurement problems limit the possible interpretation of results. First, and most important, although we have found significant differences in management behaviors between low and high task complexity, these differences may be due to difference in the content of curriculum. The fact that virtually all the cases in the high complexity condition consisted of science classes and that most of the low complexity condition were math classes means that the differences observed can be attributed to differences between two distinct subject areas, and not to complexity of task arrangements. Future research should control on subject matter and intellectual content of the subjects.

Another problem of the study is that multiple observations of the same teachers and students are treated as independent occurrences. In addition, the number of observations taken on teachers and students and target children are variable between classes. The reality of field study is that the researcher cannot control many of the things that happen, such as absences of children, attrition, and the number of times the observer is actually able to observe in the classroom during the required periods.

Finally, no claim to generalizability can be made from the study. The sample consisted of bilingual classrooms; the small number of teachers and possible unrepresentativeness of the sample limits the applicability of the

findings to other classrooms. Of particular importance in addressing the issue of generalizability is the heterogeneity in language and academic achievement presented by these classrooms. The use of routine bureaucratic techniques may have been inhibited by the highly variable nature of the students. Even though the task arrangements may have been low in complexity, the characteristics of the learners presented a complex technical problem in all cases. Future research must increase the number of classes and broaden the representativeness of the students.

Implications

There are two levels of implications to be drawn from this study: the basic research question concerning the contribution of organizational theory to classroom research, and the clinical question for educational practitioners of the inter-relationship of task arrangements, management and task engagement.

Organizational contingency theory (Galbraith, 1973; Thompson, 1967) provides a useful way of conceptualizing the relationship between teachers and students in classrooms. The literature on teachers, students and task engagement is extensive but equivocal. One important reason has been the failure to conditionalize this relationship according to organizational variables. Early sociological conceptions of classrooms (Parsons, 1959; Dreeben, 1968) stressed the uniformity of task arrangements while our data and other recent research (see, for example, Bossert, 1979) provide evidence of diversity. As a result of increased heterogeneity of students and attempts by teachers, curriculum developers, and special interest groups to individualize instruction, variation can be found in contemporary classrooms. This paper makes use of organizational theory to offer a

better understanding of how different conditions of complexity in task arrangements lead to different managerial styles, with their consequences for productivity.

For practitioners the important question is how strategies for management of classrooms can be adjusted to best suit the materials being presented. Evidence from the paper suggests that under conditions of highly complex curricular organization, delegation of authority will allow students to solve task-related problems while freeing the teacher to concentrate on exceptions and other problems in the work flow. The costs of managing complexity are, however, high. Careful planning must be relied on if curriculur diversity is to survive at the classroom level. A complex program requires hours of preparation. Delegation of authority to students is a radical change from the traditional way classrooms are organized. These changes may be resisted or found too difficult by some teachers. Even when task complexity is low, there are optimal management behaviors. Frequent contact in instruction, be it teacher or student contact, is beneficial to student task engagement.

Notes

1. The data upon which this paper is based were collected and analyzed under the sponsorship of two separate grants: National Institute of Education Grant No. NIE-G-78-0158 and National Institute of Education Grant No. NIE-G-80--0217. The opinions expressed in this paper do not necessarily reflect the position or policy of the funding agency and no official endorsement by the agency should be inferred. The ideas in this paper represent the basis of a Ph.D. dissertation for the third author (Rosenholtz, 1981).

2. These subjects were chosen because of their similarities in content but their hypothesized difference in task complexity. It was expected that most of the low task complexity observations would be in the math lessons while the high complexity condition would be found in science.

3. This innovative curriculum, described in De Avila (1981), represents a highly differentiated task structure based on a series of learning centers. The materials and instructions for their use in the classroom were presented to the teachers in special inservice sessions that teachers were paid to attend during the summer. What was not standardized was the management system adopted by teachers to coordinate the students' activities. On the other hand, the math lessons were part of the regular curriculum prescribed by the participating districts.

4. Refinement or clarification was preferred to perfect standardization on the grounds that it was more important for the observations to be closely aligned with the underlying concepts of the study.

FIGURE 1:

CONCEPTUAL MODEL

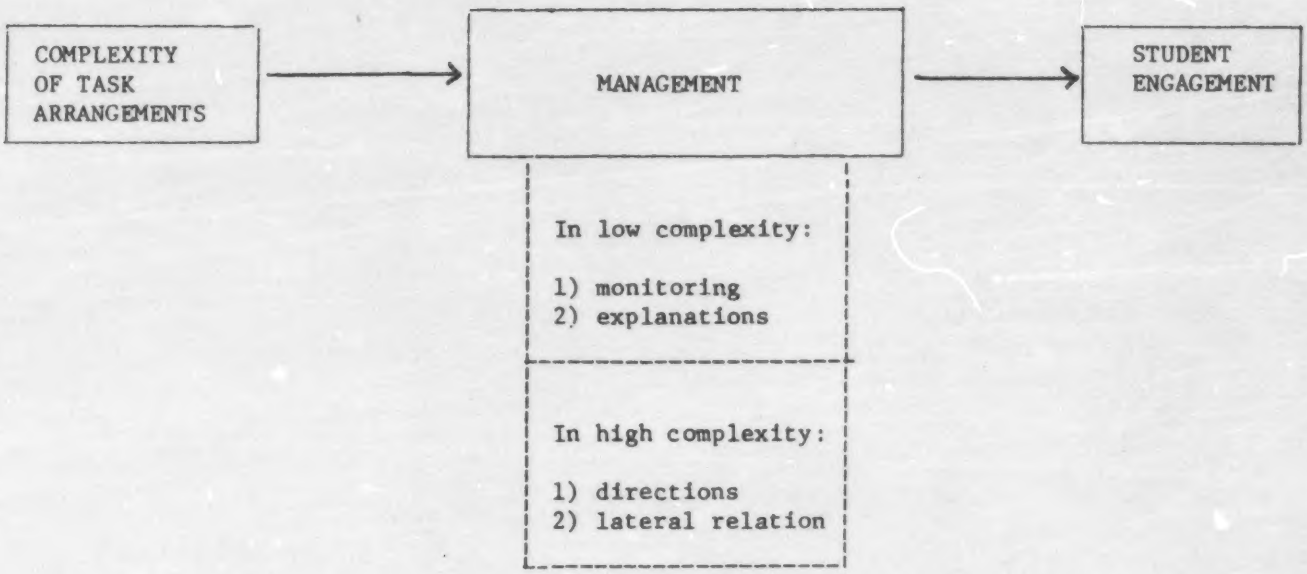

TABLE 1:

SUMMARY FREQUENCY DISTRIBUTIONS*
FOR THE EMPIRICAL INDICATORS

Variable	Category	Score	Observations	Frequency
Complexity of Task Arrangements	low	.03-.14	89	48%
	high	.15-.33	96	52%
Management				
1. Facilitations (task directions)	low	0	552	60%
	moderate	1-2	262	29%
	high	3-14	102	11%
2. Facilitations as a Result of Need	low	0	719	79%
	moderate	1	132	14%
	high	2-5	55	7%
3. Delegation of authority (lateral relations)				
a. peer task talk	low	0	418	46%
	moderate	1-2	227	25%
	high	3-14	262	29%
b. working together	none	0	603	67%
	low	.05-.20	99	11%
	moderate	.21-.56	98	11%
	high	.57-1.00	102	11%
4. Monitoring	low	0	76	41%
	moderate	1-3	62	33%
	high	4-16	49	26%
5. Explanations	low	0	80	43%
	moderate	1-3	66	25%
	high	4-19	41	22%
Engagement	low	.00-.50	133	15%
	moderate	.51-.97	290	34%
	high	.98-1.00	434	51%

* The distributions across most variables were skewed enough that mean scores did not represent a realistic summary. Likewise, the distribution of scores was scattered enough that full frequency distributions would have been clumsy. A middle ground solution of dividing the responses into discrete categories was chosen as the most parsimonious means to display the descriptive results.

Table 2:

STATISTICAL TESTS OF
HYPOTHESIZED RELATIONSHIPS

Hypothesis	Relationship	Management Means	Statistical Test
H_1	complexity ⟶ facilitations (task directions)	lo = .98 hi = .78	χ^2 = 1.24, ns
H_2	complexity ⟶ facilitations as result of need	lo = 0.5 hi = 0.7	χ^2 = 5.87**
H_3	complexity ⟶ lateral relations		
	a. peer task talk	lo = 0.80 hi = 2.97	t = 13.76***
	b. working together	lo = .04 hi = .26	t = 12.71***
H_4	In low complexity		
	a. monitoring ⟶ engagement		S_r = .05, ns
	b. explanations ⟶ engagement		S_r = .20***
H_5	In high complexity		
	a. directions ⟶ engagement		S_r = .01, ns
	b. lateral relations ⟶ engagement		S_r = .26***

* .01 ≤ p ≤ .05
** .001 ≤ p ≤ .01
*** p ≤ .001

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